DOCUMENT RESUME

ED 126 229 CE 005 960

AUTHOR	Barrett, Gerald V.; And Others
TITLE	The Relationship Between Individual Attributes and Job Design: Monitoring Tasks. Technical Report No. 4.
INSTITUTION	Akron Univ., Ohio. Dept. of Psychology.
SPONS AGENCY	Office of Naval Research, Washington, D.C. Personnel and Training Research Programs Office.
PUB DATE	30 Jun 75
CONTRACT	NONR-N000 14-74-A-0202-0001
NOTE	97p.; For related reports, see ED 113 488-489 and CE 005 961
EDRS PRICE	MF-$0.83 HC-$4.67 Plus Postage.
DESCRIPTORS	*Comparative Analysis; Data Analysis; *Individual Characteristics; *Job Satisfaction; *Performance Factors; Performance Tests; Tables (Data); *Task Performance; Work Attitudes; Work Environment

ABSTRACT

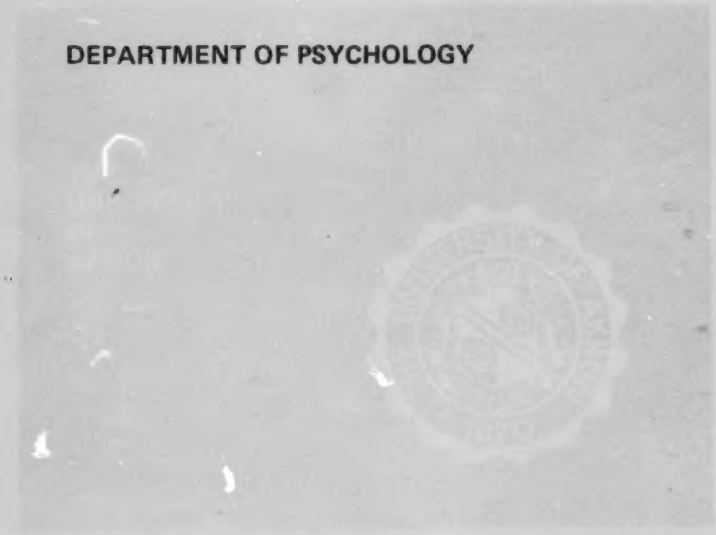
The study focused on the individual attributes predictive of performance and work satisfaction in two contrasting work situations: (1) with a simple task to be perceived as low on job structural attributes (LJSA) and (2) with a more complex task designed to have a higher level of job structural attributes (HJSA). The job structural variables of job complexity, variety, responsibility, and external feedback were manipulated. It was expected that different attributes and combination of attributes would be predictive in the two task situations. A sample of 33 male and 25 female undergraduate students participated in the experiment. The data are presented, with lengthy discussion, in 38 tables which comprise the major portion of the document. The results demonstrate the strong influence of individual attributes upon performance and satisfaction on two monitoring tasks with different job structural attributes, and also indicate that complex interactions between individual and job structural attributes determine task performance and satisfaction. A list of references is included. (Author/EC)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

DEC 1 5 1975

ED126229

DEPARTMENT OF PSYCHOLOGY



U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

CE005960

ED126229

Technical Report 4

The Relationship Between Individual Attributes and Job Design: Monitoring Tasks

Gerald V. Barrett, J. Benjamin Forbes,

Ralph A. Alexander, Edward O'Connor,

and Leslie Balascoe

The University of Akron

ONR Contract

NONR N00014-74-A-0202-0001, NR 151, 351

June 1975

This document has been approved for public release and sale; its distribution is unlimited. Reproduction in whole or in part is permitted for any purpose of the United States Government.

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER: Technical Report No. 4	2. GOVT ACCESSION NO.
3. RECIPIENT'S CATALOG NUMBER	
4. TITLE (and Subtitle): The Relationship Between Individual Attributes and Job Design: Monitoring Tasks	5. TYPE OF REPORT & PERIOD COVERED: Technical Report No. 4
	6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s): Gerald V. Barrett, J. Benjamin Forbes, Ralph A. Alexander, Edward J. O'Connor, Leslie L. Balascoe	8. CONTRACT OR GRANT NUMBER(s): N00014-74-A-0202-0001
9. PERFORMING ORGANIZATION NAME AND ADDRESS: Department of Psychology, University of Akron, Akron, Ohio 44325	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS: 61153N; RR042-04; RR042-04-12 NR 151-351
11. CONTROLLING OFFICE NAME AND ADDRESS: Personnel and Training Research Programs, Office of Naval Research (Code 458), Arlington, VA 22217	12. REPORT DATE: June 30, 1975
	13. NUMBER OF PAGES: 83
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)	15. SECURITY CLASS. (of this report): UNCLASSIFIED
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Job Design, Individual Attributes, Vigilance, Visual Monitoring, Perceptual Style, Work Orientation, Task Performance, Work Satisfaction, Job Structural Attributes.

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Two visual monitoring tasks were developed, one high in job complexity, variety, responsibility, and external feedback, and one low on these job structural attributes. Performance and satisfaction on these tasks were related to individual differences in perceptual style, general intellectual ability, personality and work preference measures. The results indicate that complex interactions between individual and job structural attributes determine task performance and satisfaction.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE
S/N 0102-014-6601

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

TABLE OF CONTENTS

		Page
I.	Introduction	1
II.	Method	2
III.	Results	6
IV.	Discussion	38
V.	References	46
VI.	Appendix A	50
VII.	Appendix B	59
VIII.	Appendix C	66
IX.	Appendix D	67
X.	Appendix E	68
XI.	Appendix F	70
XII.	Appendix G	71
XIII.	Appendix H	72
XIV.	Appendix I	82

LIST OF TABLES

Table		Page
1.	Overall Response Times and Average Error Rates by Condition.....	7
2.	Descriptions on Work Itself-Work Environment of Manipulated Job Structural Attributes by Condition.....	9
3.	Descriptions on Attribute Description Scale of Job Structural Attributes by Condition.....	10
4.	Correlations of General Intellectual Ability (Wesman) with Response Time, Errors, and Satisfaction by Condition	11
5.	Correlations of Perceptual Style Measures with Response Time, Errors, and Satisfaction by Condition	13
6.	Correlations of Maudsley Personality Inventory with Response Time, Errors, and Satisfaction by Condition	14
7.	Correlations of Survey of Work Value Scales with Response Time, Errors and Satisfaction by Condition	15
8.	Correlations of Attribute Preferences, Attribute Descriptions and the Absolute Value of the Difference with Response Times, Errors, and Satisfaction by Condition	18
9.	Correlations of Work Itself-Work Environment, Job Structural Preferences, Descriptions, and the Absolute Value of the Difference with Response Time, Errors and Satisfaction by Condition	20
10.	Correlations of Picture Arrangement Test Scores with Response Time, Errors, and Satisfaction by Condition	21
11.	Correlation of General Intellectual Ability with Performance Decrements Within Each Hour - LJSA Condition	22
12.	Correlation of General Intellectual Ability with Performance Decrements Within Each Hour - HJSA Condition	23
13.	Correlations of Specific Abilities with Performance Decrements Within Each Hour - LJSA Condition	24
14.	Correlations of Specific Abilities with Performance Decrements Within Each Hour - HJSA Condition	26

LIST OF TABLES
(Continued)

Table		Page
15.	Correlations of Personality Measures with Performance Decrements Within Each Hour - LJSA Condition	27
16.	Correlations of Personality Measures with Performance Decrements Within Each Hour - HJSA Condition	28
17.	Correlations of General and Specific Ability Measures with Performance Decrements Across Hours By Condition	29
18.	Correlations of Job Orientation Inventory Scales with Performance Decrements Across Hours By Condition	31
19.	Combination of the Strongest Specific Ability Predictor Group Embedded Figures Test (GEFT) with Personality/Preference Measures to Predict Total Average Errors By Condition	32
20.	Combination of the General Ability Predictor (Wesman) with Personality/ Preference Measures to Predict Total Average Errors by Condition	34
21.	Combination of Personality/Preference Measures to Predict Total Average Errors - HJSA Condition	35
22.	Combination of Ability Measures with the Picture Arrangement Test (PAT) to Predict Total Average Errors - HJSA Condition	36
23.	Combination of Ability and Personality/Preference Measures as Predictors of Work Satisfaction by Condition	37
24.	Simple and Partial Correlations of Preference Measures with Performance and Work Satisfaction by Condition	39
25.	Relationship Between Performance (Total Average Errors) and Work Satisfaction By Condition	40
26.	Average Performance (per slide tray) for the LJSA and HJSA Conditions Broken Down by Hour	60
27.	Analysis of Variance of Response Times	62
28.	Analysis of Variance of False Alarms	63
29.	Analysis of Variance of Incorrect Responses	64
30.	Analysis of Variance of Missed Signals	65

LIST OF TABLES
(Continued)

Table		Page
31.	Descriptions on Work Itself-Work Environment of the LJSA and HJSA Conditions After Performing the Task	66
32.	Correlations of Job Attitude Scale with Response Times, Errors, and Satisfaction by Condition	67
33.	Correlations of Job Orientation Inventory Scales with Response Times, Errors, and Satisfaction by Condition	68
34.	Correlations of Orientation Inventory with Response Times, Errors, and Satisfaction by Condition	70
35.	Correlations of Protestant Ethic Scale with Response Times, Errors, and Satisfaction by Condition	71
36.	Correlations of Work Itself-Work Environment Job Structural Preferences, Descriptions, and the Absolute Value of the Difference with Response Time, Errors and Satisfaction by Condition	72
37.	Correlation Matrix of Criterion Measures for the LJSA Condition	82
38.	Correlation Matrix of Criterion Measures for the HJSA Condition	83

Introduction

There has been a recent increase in both concern for and research related to the process and consequences of job design in organizations. Four major historical themes have characterized the various approaches to job design. The early work was concerned with the physical capacity of the individual and developing the "one best method" to perform each individual job. As a reaction to the oversimplified tasks which resulted, a second approach stressed concepts such as job enlargement or job enrichment (Walker & Guest, 1952; Herzberg, 1966). Both of these approaches made the implicit assumption that individual abilities and attributes would not interact with the job design. A third approach is characterized by the research of Turner and Lawrence (1965) and Blood and Hulin (1967) who examined group differences and job characteristics. The fourth approach is best exemplified by the research of Hackman and Lawler (1971) who focused upon individuals' perceptions of their own needs and job characteristics.

None of the above approaches simultaneously take into account individual perceptions, ability levels, and other attributes as they interact with job design. In addition, controlled experimental studies are notably lacking in the research approaches to job design.(Barrett, Dambrot & Smith, 1975).

The present study attempted to integrate the various elements of past approaches to job design. The major focus of the research was on the individual attributes predictive of performance and work satisfaction in a simple task designed to be perceived as low on job structural attributes (LJSA) in contrast to a more complex task designed to have a higher level of job

structural attributes (HJSA). The job structural variables of job complexity, variety, responsibility, and external feedback were manipulated. These job structural variables were chosen based on a previous field study indicating their perceived importance for monitoring tasks (Barrett, Bass, O'Connor, Alexander, Forbes & Cascio, 1975). It was expected that different attributes and combinations of attributes would be predictive in the two tasks.

Method

Subjects

The subjects were 60 male and female undergraduate students from the University of Akron who volunteered to participate in an experiment for $2.00 per hour. They were divided equally into two groups, but because of equipment malfunction, data were obtained for 29 subjects in each condition, 33 males and 25 females.

Apparatus and Stimulus Presentation

Stimuli consisted of sixty geometric shapes rear-projected on a 23" x 23" opaque screen by Kodak Ektagraphic slide projectors (Model E-2). In order to minimize visual alerting cues, slides were presented to each subject alternately from two projectors. MacKenzie dissolve control units (Model AD-2) were adjusted so as to minimize changes in light intensity. The screens were divided into six areas as shown in the instructions (Appendix A).

Two types of slides were presented: (1) those with irrelevant symbols plus one or more relevant symbols, and (2) those with only irrelevant symbols. Before each trial, subjects were instructed as to which shape(s) would represent the relevant signal(s).

Slides were presented for an average of 5 seconds. The actual intervals were varied randomly about this mean. The ratio of irrelevant slides to relevant slides

was approximately five to one. Therefore, relevant signals occurred approximately every 30 seconds. The slides were presented in random order. The location of the relevant symbol with respect to the six areas on the screen was also randomly distributed with approximately an equal number in each of the six areas.

Each subject was seated before a screen in one of four specially constructed booths. Three slide projectors served each booth. The rate of presentation of slides was controlled for all four booths by an Optisonics Sound-o-matic I cassette programmer-recorder. In this way, four subjects simultaneously received the identical stimuli. All subjects' responses were simultaneously recorded by a Lafayette Instrument Company Recorder (Model 76103).

Experimental Design

The design consisted of two levels of "job enlargement." In the "basic" cell, subjects were given a task designed to consist of low levels of job complexity, variety, responsibility, and external feedback (LJSA). In the "complex" cell, subjects were presented with a task of increased job complexity, variety, responsibility, and external feedback (HJSA).

The low level of job complexity and variety consisted of a task in which subjects were required to detect the presence and the movement of only one type of signal (a triangle). In the high level of complexity and variety, there were three different types of relevant signals (triangles, circles, and cloverleaves). Furthermore, the subjects were to respond to different types of movement for each type of signal.

The low level of responsibility was manipulated by instructing each subject that three other subjects were monitoring the same area and that it was only necessary for any one subject to detect a signal for the system to operate properly. High responsibility was induced by instructions indicating that each subject was solely responsible for his own individual area and that the system would operate properly only if all signals were detected.

External feedback was manipulated by informing subjects in the basic cell that only group measures would be recorded precluding individual feedback, while informing the high level groups that all their responses would be recorded and feedback would be given at the end of the session.

Procedure

Subjects reported on three consecutive days for three phases of the experiment. On the first day, subjects were given a test battery designed to measure general and specific abilities, as well as personality variables, work orientation, motivation, and preferences for job attributes. Specifically, the test battery consisted of: the Wesman Personnel Classification Test (Wesman, 1965), the Group Embedded Figures Test (Witkin, Oltman, Raskin, & Karp, 1971), the Maudsley Personality Inventory (Knapp, 1962), the Orientation Inventory (Bass, 1967), the Protestant Ethic Scale (Blood, 1969), the Job Orientation Inventory (Blood, 1973), the Job Attitude Scale (Saleh, 1964, 1971), the Survey of Work Values (Wollack, Goodale, Wijting, & Smith, 1971), the Picture Arrangement Test (Tompkins & Miner, 1957).

On the second day, subjects were given the Rod and Frame Test (Witkin, Lewis, Hertzman, Machover, Meissner, & Wapner, 1954) and the Attribute Pref-

erence Scale, a measure of preference for job structural attributes (Barrett, Bass, O'Connor, Alexander, Forbes & Cascio, 1975). They were then seated at their booths and given the instructions for the monitoring task (see Appendix A). After all four subjects had read the instructions to themselves, they put on headphones and listened to a standard taped review of the instructions. A 15-minute training session followed in which slides were presented exactly as in the experimental task. However, for the first five minutes of the training session, the correct response was communicated to the subjects by a taped program. Subjects' responses during the latter part of the training session were monitored to ensure that they understood the task.

The actual experimental task was run on the third day. Subjects were seated at their booths and given a four-minute version of the Hand Skills Test (Kipnis, 1962). They then were allowed to review the task instructions. When finished, they put on headphones through which "white noise" was transmitted at subjectively comfortable levels.

The experimental session consisted of three one-hour vigils. Each hour's stimuli were presented by four pairs of slide trays. The end of each pair of trays was indicated by the occurrence of two blank slides. At the end of the first hour, a fifth pair of trays was presented for exactly six minutes. Then the slides were halted and the subjects were asked to do a magnitude estimation of the time since the last blank slide (six minutes) using the time spent at the Hand Skills Test (four minutes) as a standard. This magnitude estimation was repeated at the end of the second and third hours with two and four minutes of slide presentation as the respective stimuli.

Subjects were to respond to stimuli by pressing the appropriate buttons on a seven-button console which was on the table top between the subjects and the screen. In the simpler task, the detection of a triangle was indicated by pressing the #7

button. Movement of a triangle towards the center of the screen was noted by pressing the button whose number (1-6) corresponded to the number of the area in which the movement took place.

In the more complex task, subjects were to respond to the occurrence of triangles, circles, or cloverleaves by pressing button #7. In addition, inward movement of triangles, outward movement of circles, and clockwise movement of cloverleaves were to be responded to with identification of the area of movement (see instructions - Appendix A). The number of relevant signals per slide tray was the same in both tasks (28-30) as was the number of times relevant movement occurred (10 times per tray). Measures of missed signals, incorrect responses, false alarms, and response times were continuously taken.

After the monitoring task, the following measures of job perception and satisfaction were taken: the Work Itself/Work Environment Questionnaire (Cascio, 1973), the Attribute Description Scale (Barrett, Bass, O'Connor, Alexander, Forbes & Cascio, 1975), the Job Descriptive Index (Smith, Kendall & Hulin, 1969). Subjects in the low condition were given no information regarding performance. Those in the high condition were told that their performance was "above average," "average," or "below average." This was done after all post-experimental measures had been taken.

Results

The performance data on the simple and complex monitoring tasks are compared in Table 1. As was expected, the response time was longer and there were significantly more errors in the high job structural attribute (HJSA) condition than in the simpler low job structural attribute (LJSA) condition.

Table 1

Overall Response Times and Average Error Rates

by Condition[a]

Overall Averages[b]	M	SD	t Value	
Response Time (sec.)				
LJSA	2.46	.56	-4.31	***
HJSA	3.05	.45		
False Alarms				
LJSA	.20	.19	-4.70	***
HJSA	.60	.42		
Missed Signals				
LJSA	2.51	1.93	-5.40	***
HJSA	5.77	2.62		
Incorrect Responses				
LJSA	2.29	1.54	-6.16	***
HJSA	5.40	2.24		
Total Errors				
LJSA	4.99	3.25	-7.63	***
HJSA	11.77	3.51		

[a] n = 29 except for HJSA Response Time where n = 26.

[b] per set of slide trays (30 signals).

***$p < .001$ (two-tailed).

The data by each of the three hours is also presented in Appendix B, as are the analyses of variance of performance by hour and time within each hour.

The time estimation data are not presented here but will be discussed in a future technical report.

Upon completion of the monitoring task, each subject described the task on the Work Itself/Work Environment Questionnaire with respect to each of the job structural attributes listed in the first column of Table 2. Of the manipulated attributes, job complexity and external feedback were significantly different for the two conditions in the expected direction with the more complex condition perceived to have more of the attributes. Data on other described job structural attributes are presented in Appendix C.

Subjects also filled out the Attribute Description Scale for the dimensions shown in the left hand column of Table 3. Again, the results were in the expected direction, with both responsibility and complexity being perceived as more salient in the complex monitoring task.

A third, more general job measure of work satisfaction from the JDI was also administered. There was no significant difference on this measure with the low job structural attribute condition having a mean of 17.31, and the high job structural attribute condition mean being 16.03.

Relationship of Predictors to Criterion Measures

A measure of general intellectual ability, the Wesman Personnel Classification Test, was related to the dependent measures for the two monitoring conditions as shown in Table 4. Intellectual ability was not related to response time or false alarms but was significantly related to the missed signals, incorrect responses, and total errors. The higher, more consistent relationships were obtained in the low job structural attribute

Table 2

Descriptions on Work Itself/Work Environment of

Manipulated Job Structural Attributes by Condition

Work Itself/ Work Environment Description of:	LJSA[a] Condition M	SD	HJSA[a] Condition M	SD	t
Variety	1.95	0.98	2.16	1.04	.78
Responsibility	3.07	1.02	2.95	1.39	-.38
Job Complexity	1.90	0.77	2.50	1.22	2.25*
External Feedback	1.10	0.39	1.74	1.22	2.68**

[a] $n = 29$.

* $p \leq .05$ (two-tailed).

** $p \leq .01$ (two-tailed).

Table 3

Descriptions on Attribute Description Scale of Job Structural Attributes by Condition

	LJSA[a] Condition		HJSA[a] Condition		
	M	SD	M	SD	t
Variety	27.31	12.04	29.45	15.30	.59
Responsibility	29.59	18.00	39.52	16.12	2.21 *
Complexity	26.93	13.93	35.10	16.03	2.07 *
Independence	22.69	19.63	25.69	18.01	.61

[a] $n = 29$.

* $p < .05$ (two-tailed).

Table 4

Correlations of General Intellectual Ability (Wesman) with Response Time, Errors, and Satisfaction by Condition[a]

	Response Time	False Alarms	Missed Signals	Incorrect Responses	Total Errors	Work Satisfaction
Verbal						
HJSA	.07	- .26	- .37*	- .16	- .41*	- .45*
LJSA	- .16	- .15	- .51**	- .71***	- .65***	.00
Numerical						
HJSA	.17	- .29	- .19	- .20	- .33	- .17
LJSA	.02	.01	- .34	- .66***	- .51***	- .13
Total Score						
HJSA	.14	- .34	- .37*	- .22	- .47**	- .41*
LJSA	- .09	- .09	- .50**	- .79***	- .68***	- .07

[a] $n = 29$ except for HJSA Response Time where $n = 26$.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

condition. Those with superior verbal ability evaluated the work least favorably in the high condition, while there was no relationship between the variables in the low condition.

The Rod and Frame Test (RFT) and the Group Embedded Figures Test (GEFT), two measures of perceptual style, were significantly related to performance as shown in Table 5. The Embedded Figures Test has a stronger, more consistent relationship to errors than the Rod and Frame Test. It also relates to work satisfaction, while the Rod and Frame Test does not. As predicted, the field independent individuals made fewer errors but received the least satisfaction in both conditions.

The Maudsley Personality Inventory was predictive of performance only in the more complex monitoring condition. As can be seen in Table 6, the only significant relationships were with extraversion, indicating that more extraverted individuals made more errors.

Table 7 contains the correlations among the scales of the Survey of Work Values and the performance criteria for the two monitoring tasks. An interesting reversal exists with extrinsic orientation being positively related to errors in the high monitoring condition, but negatively related to errors in the low condition.

Using the Job Attitude Scale, no significant relationships were found with any of the criteria in either condition (Appendix D). In addition, the Job Orientation Inventory (Appendix E) shows a pattern of generally low nonsignificant correlations between the separate scales and the criteria as does the Orientation Inventory (Appendix F) and the Protestant Ethic Scale (Appendix G).

Table 5

Correlations of Perceptual Style Measures with

Response Time, Errors, and Satisfaction by Condition

	Response Time	False Alarms	Missed Signals	Incorrect Responses	Total Errors	Work Satisfaction
GEFT Total						
HJSA [a]	.10	-.28	-.18	-.50*	-.49*	-.59***
LJSA [b]	-.01	-.02	-.61***	-.69***	-.69***	-.41*
RFT						
HJSA [a]	.05	.03	.51**	.15	.46*	.16
LJSA [c]	.02	.06	.28	.46*	.39*	-.16

[a] $n = 29$ except HJSA Response Time where $n = 26$.

[b] $n = 29$.

[c] $n = 28$.

*$p < .05$.

**$p < .01$.

***$p < .001$.

Note. For the GEFT the score is the number correct; therefore, a high score indicates field independence. The score for the RFT is degrees from vertical; therefore, a low score indicates field independence.

Table 6

Correlations of Maudsley Personality Inventory with Response Time, Errors, and Satisfaction by Condition

	Response Time	False Alarms	Missed Signals	Incorrect Response	Total Errors	Work Satisfaction
Neuroticism						
HJSA[a]	.08	.03	- .01	- .03	- .02	- .24
LJSA[b]	- .14	.29	- .02	.21	.13	- .16
Extraversion						
HJSA[a]	.07	.00	.41*	.18	.40*	.07
LJSA[b]	.19	.12	.22	.33	.30	.02

[a] $n = 29$ except for Response Time where $n = 26$.

[b] $n = 28$.

*$p < .05$.

Table 7

Correlations of Survey of Work Value Scales with

Response Time, Errors and Satisfaction by Condition[a]

	Response Time	False Alarms	Missed Signals	Incorrect Responses	Total Errors	Work Satisfaction
Earnings						
HJSA	- .22	.08	.14	.17	.22	.19
LJSA	- .36	.02	- .37*	- .24	- .33	.08
Social Status						
HJSA	.01	.20	.38*	.17	.41*	.15
LJSA	- .04	.08	- .26	- .29	- .28	.08
Upward Striving						
HJSA	- .53**	.25	.19	.05	.22	.06
LJSA	- .06	.19	- .09	- .27	- .16	.06
Activity Preference						
HJSA	- .42*	.15	- .16	- .03	- .10	.15
LJSA	.04	.39*	- .10	- .13	- .07	- .06
Job Involvement						
HJSA	.11	.03	- .11	- .04	- .09	- .36
LJSA	- .11	.23	.19	.18	.23	.22
Pride in Work						
HJSA	- .08	.07	.01	- .03	.01	.08
LJSA	- .07	.14	- .05	- .07	- .05	- .07

Table 7 (Continued)

	Response Time	False Alarms	Missed Signals	Incorrect Responses	Total Errors	Work Satisfaction
Intrinsic						
HJSA	- .19	.12	- .20	- .03	- .13	- .0[illegible]
LJSA	- .05	.32*	.01	- .02	.03	.03
Extrinsic						
HJSA	- .12	.17	.33*	.20	.39*	.20
LJSA	- .22	.06	- .36*	- .30	- .35*	.09

[a] n = 29 except for HJSA Response Time where n = 26.

*$p < .05$.

**$p < .01$.

The relationships of the Attribute Preference Scale, the Attribute Description Scale, and the absolute differences between the preferred and described amounts of each of the job structural attributes with the criteria are shown in Table 8. The most important relationships were between the absolute difference scores and work satisfaction. As was predicted, the greater the absolute difference between the preferred and described job attributes, the less favorably the job was described, in the high condition only. It is also important to note that, in the high condition, the more of the job structural attributes described in the job, the more favorable the work satisfaction.

The influence of the manipulated job structural attributes is even more striking when one examines (Table 9) the relationship of the criteria with the sum of the variety, responsibility, job complexity, and external feedback from the Work Itself/ Work Environment Questionnaire (WI/WE). For example, in the high condition, a correlation of .76 existed between the WI/WE described attributes and work satisfaction. The full results from the Work Itself/Work Environment Quesionnaire are shown in Appendix H.

The motivational dimensions from the Picture Arrangement Test, Table 10, showed a few significant relationships with the criteria. Work Failure, for example, is positively associated with false alarms, missed signals, and total errors while Happiness is negatively correlated with missed signals, incorrect responses, and total errors.

Analysis of Performance Hour by Hour

Table 11 shows the relationship between performance decrements within each hour for the low job structural attribute condition, and the measure of general intellectual ability (Wesman Personnel Classification Test). The small number of significant correlations seem to indicate that those with superior general intellectual ability have less decrement in performance within each hour. The same data is shown

Table 8

Correlations of Attribute Preferences

Attribute Descriptions and the Absolute

Value of the Difference with Response Times,

Errors, and Satisfaction by Condition[a]

	Response Time	False Alarms	Missed Signals	Incorrect Response	Total Errors	Work Satisfaction
Complexity Preferred						
HJSA	- .09	- .05	- .21	.28	.01	.39*
LJSA	.06	- .12	- .16	- .17	- .19	.02
Complexity Described						
HJSA	.01	.13	- .10	- .05	- .07	.28
LJSA	.05	- .06	- .10	- .10	- .11	.04
Absolute Difference						
HJSA	.18	.07	- .07	.15	.06	- .24
LJSA	.03	- .06	.15	- .02	.07	- .11
Responsibility Preferred						
HJSA	- .32	.16	- .13	- .03	- .08	.39*
LJSA	.20	- .38*	.00	.06	- .01	.19
Responsibility Described						
HJSA	- .09	.11	- .10	.14	.04	.51**
LJSA	.25	- .15	.11	.23	.15	-.18
Absolute Difference						
HJSA	- .08	- .05	.26	- .05	.14	- .31
LJSA	.01	- .15	- .04	- .17	- .12	.27

[a] $n = 29$ except for HJSA Response Time where $n = 26$.

* $p < .05$.

** $p < .01$.

Table 8 (Cont'd.)

	Response Time	False Alarms	Missed Signals	Incorrect Response	Total Errors	Work Satisfaction
Independence Preferred						
HJSA	.15	.01	- .18	- .03	- .14	- .21
LJSA	.03	- .29	.18	.21	.17	.08
Independence Described						
HJSA	- .23	.17	- .01	- .21	.02	.39*
LJSA	.46*	- .01	.09	.33	.21	- .07
Absolute Difference						
HJSA	.20	- .16	- .08	- .04	- .11	- .42*
LJSA	- .09	- .14	.03	- .21	- .10	- .14
Variety Preferred						
HJSA	.21	- .22	- .08	- .15	- .20	- .39*
LJSA	- .12	- .45*	- .06	- .06	- .11	.46*
Variety Described						
HJSA	- .13	- .12	- .00	- .06	- .07	.25
LJSA	.17	- .06	.15	.22	.18	.14
Absolute Difference						
HJSA	.28	- .06	.03	- .07	- .04	- .47**
LJSA	- .21	- .33	- .29	- .34	- .37*	- .03
Total Described						
HJSA	- .17	.10	- .07	.00	- .02	.48**
LJSA	.33	- .09	.08	.24	.15	- .05
Total Preferred						
HJSA	- .07	- .06	- .34	.09	- .20	.20
LJSA	.18	- .41*	.00	.03	- .03	.22
Absolute Difference						
HJSA	.12	- .16	- .05	.01	- .07	- .46*
LJSA	- .06	- .08	- .07	- .20	- .15	- .07

Table 9

Correlations of Work Itself/Work Environment, Job Structural Preferences, Descriptions, and the Absolute Value of the Difference with Response Time, Errors and Satisfaction by Condition[a]

	Response Time	False Alarms	Missed Signals	Incorrect Responses	Total Errors	Work Satisfaction
Sum of Variety, Responsibility, Job Complexity, and Ext. Feedback						
Described						
HJSA	- .15	.36	.09	.28	.31	.76***
LJSA	- .20	.36	.29	.22	.32	.42*
Preferred						
HJSA	- .01	- .10	.19	.11	.18	.14
LJSA	- .12	.23	- .32	- .41*	- .35	.04
Absolute Difference						
HJSA	.17	- .36	- .05	- .18	- .23	-.57***
LJSA	.09	- .01	- .37*	- .43*	- .42*	- .51**

[a] n = 29 except for HJSA Response Time where n = 26.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

TABLE 10

Correlations of Picture Arrangement Test Scores with Response Time, Errors, and Satisfaction by Condition[a]

	Response Time	False Alarms	Missed Signals	Incorrect Responses	Total Errors	Work Satisfaction
Dependence						
HJSA	-.07	-.03	.01	.41*	.25	.08
LJSA	-.25	.13	-.06	-.20	-.11	.01
Sociophilia						
HJSA	-.06	-.28	-.17	-.23	-.32	-.17
LJSA	.21	-.19	-.22	-.08	-.20	-.02
Self Confidence						
HJSA	.12	-.06	-.18	-.35	-.35	.13
LJSA	.16	.25	.04	-.14	.00	.04
Happiness						
HJSA	.08	-.04	-.24	-.22	-.31	.10
LJSA	-.15	.21	-.40*	-.49**	-.44*	.14
Low Aggression						
HJSA	.50**	-.10	.20	.22	.25	.08
LJSA	.19	.08	.03	-.21	-.07	.14
Work Failure						
HJSA	-.01	-.13	.55**	.03	.37*	-.11
LJSA	-.21	.38*	.10	.16	.19	-.02
Negative Work Attitude						
HJSA	.04	-.10	.13	-.09	.01	.11
LJSA	.13	-.16	.15	.28	.20	.14

[a] n = 28 per condition except for HJSA Response Time where n=26.
* p <.05.
** p <.01.

Table 11

Correlation of General Intellectual Ability with Performance Decrements[+] Within Each Hour - LJSA Condition[a]

Increase in:	Hour	Wesman Verbal	Wesman Numerical	Wesman Total
Response Time	1	-.18	-.23	-.23
	2	-.24	.06	-.12
	3	-.40*	-.09	-.30
False Alarms	1	-.08	-.13	-.12
	2	-.03	.22	.10
	3	-.14	.00	-.09
Missed Signals	1	-.27	-.40*	-.38*
	2	-.19	-.37	-.31
	3	-.26	-.08	-.20
Incorrect Responses	1	.30	.13	.25
	2	.07	-.27	-.10
	3	.28	.01	.18
Total Errors	1	-.09	-.28	-.20
	2	-.09	-.38*	-.25
	3	-.01	-.05	-.03

[+]Last quarter of hour minus first quarter of hour.

[a] $n = 29$.

*$p < .05$.

for the high job structural attribute condition in Table 12. None of the relationships were significant for the high condition between intellectual ability and performance decrements within each hour.

Tables 13 and 14 show the relationships between the perceptual style measures and performance decrements within each hour for the low and high job structural attribute conditions, respectively. Again, any significant results were in the expected direction with the field-independent people showing a smaller performance decrement than the field-dependent individuals.

The relationship of the Maudsley Personality Inventory with performance decrement is shown in Tables 15 and 16 for the low and high job structural attribute conditions, respectively. The interesting finding is seen in comparing the significant relationships with missed signals and incorrect responses for the Extraversion Scale. For those scoring higher on the Extraversion Scale, there was an increase in missed signals, but a decrease in incorrect responses in both conditions. This does not appear to be an artifact, since missed signals and incorrect responses correlated significantly in the low job structural attribute condition but were not related in the high job structural attribute condition (see Appendix D).

The strongest predictor of performance decrement across hours was the RFT measure of perceptual style (Table 17). In the high condition, for example, a .48 relationship was found between Hour 3 minus Hour 1 and the RFT.

Table 12

Correlation of General Intellectual Ability with Performance Decrements[+] Within Each Hour - HJSA Condition[a]

Increase in:	Hour	Wesman		
		Verbal	Numerical	Total
Response Time	1	.16	.10	.17
	2	-.25	.11	-.12
	3	.21	-.02	.14
False Alarms	1	-.06	-.02	-.05
	2	.02	-.22	-.11
	3	-.15	-.07	-.15
Missed Signals	1	.16	-.23	-.01
	2	.00	.05	.03
	3	-.05	-.25	-.17
Incorrect Responses	1	.32	.25	.36
	2	-.02	-.07	-.06
	3	.18	.23	.25
Total Errors	1	.26	-.09	.13
	2	-.01	-.08	-.05
	3	.06	-.04	.02

[+]Last quarter of hour minus first quarter of hour.

[a]n = 29.

Table 13

Correlations of Specific Abilities with Performance Decrements[+]

Within Each Hour - LJSA Condition

Increase in:	Hour	GEFT[a] Raw Scores	GEFT[a] Inverse	RFT[b] Series 3
Response Time	1	-.18	.06	.27
	2	-.30	.09	-.14
	3	-.23	.38*	.10
False Alarms	1	-.23	.08	.46*
	2	.13	-.11	-.15
	3	.01	.19	-.11
Missed Signals	1	-.27	.25	.41*
	2	-.28	.26	.23
	3	-.29	.30	.14
Incorrect Responses	1	.10	-.08	.16
	2	-.12	.09	.02
	3	.35	-.39*	.03
Total Errors	1	-.23	.18	.51**
	2	-.24	.21	.16
	3	.04	-.02	.11

[+] Last quarter of hour minus first quarter of hour.

[a] $n = 29$.

[b] $n = 28$.

* $p < .05$.

** $p < .01$.

Table 14

Correlations of Specific Abilities with Performance Decrements[+] Within Each Hour - HJSA Condition[a]

Increase in:	Hour	GEFT Raw Scores	GEFT Inverse	RFT Series 3
Response Time	1	.26	-.31	.10
	2	-.05	-.08	.19
	3	.18	-.32	-.21
False Alarms	1	.02	.11	-.26
	2	.08	-.04	.04
	3	.38*	-.20	-.29
Missed Signals	1	-.19	-.02	.29
	2	-.07	.14	.25
	3	-.24	.18	.52**
Incorrect Responses	1	.10	.00	-.23
	2	-.22	.02	-.02
	3	.22	-.09	-.25
Total Errors	1	-.11	.03	.03
	2	-.24	.18	.32
	3	.07	.03	.15

[+]Last quarter of hour minus first quarter of hour

[a] $n = 29$

*$p < .05$.

**$p < .01$.

Table 15

Correlations of Personality Measures with Performance Decrements[+] Within Each Hour - LJSA Condition[a]

Increase in:	Hour	Maudsley Personality Inventory	
		Extraversion	Neuroticism
Response Time	1	-.01	.23
	2	.16	-.22
	3	.06	.03
False Alarms	1	.09	.09
	2	-.13	.35
	3	-.14	.14
Missed Signals	1	.29	-.12
	2	.47*	.18
	3	.26	.25
Incorrect Responses	1	-.42*	-.20
	2	.18	.00
	3	.03	.01
Total Errors	1	.05	-.16
	2	.40*	.15
	3	.15	.20

[+]Last quarter of hour minus first quarter of hour.

[a] $n = 28$.

*$p < .05$.

Table 16

Correlations of Personality Measures with Performance Decrements[+] Within Each Hour - HJSA Condition[a]

Increase in:	Hour	Maudsley Personality Inventory	
		Extraversion	Neuroticism
Response Time	1	.32	.09
	2	.21	-.02
	3	.03	.32
False Alarms	1	-.17	.20
	2	-.09	.18
	3	.02	.27
Missed Signals	1	-.01	.08
	2	.29	-.16
	3	.39*	-.26
Incorrect Responses	1	-.08	-.13
	2	-.08	.13
	3	-.40*	-.22
Total Errors	1	-.12	.11
	2	.28	-.05
	3	.01	-.32

[+]Last quarter of hour minus first quarter of hour.

[a]$n = 29$. * $p < .05$.

Table 17

Correlations of General and Specific Ability Measures with Performance Decrements Across Hours by Condition

	Wesman			GEFT		RFT
Increase in Total Errors	Verbal	Numerical	Total	Raw Scores	Inverse	Series 3
LJSA[a]						
Hour 2 - Hour 1	-.14	.26	.05	-.01	.01	-.09
Hour 3 - Hour 2	-.04	-.25	-.16	-.20	.33	.46*
Hour 3 - Hour 1	-.18	-.02	-.12	-.22	.36	.42*
HJSA[b]						
Hour 2 - Hour 1	.25	.20	.28	.19	-.22	.10
Hour 3 - Hour 2	-.35	-.25	-.38*	-.32	.18	.55**
Hour 3 - Hour 1	-.04	-.01	-.03	-.06	-.06	.48**

[a] $n = 29$ except for RFT where $n = 28$.

[b] $n = 29$.

*$p \leq .05$.

**$p \leq .01$.

The relationships between the Job Orientation Inventory and performance decrement across hours for the two conditions is shown in Table 18. The results are extremely difficult to interpret. For example, Pay correlated .48 with Hour 2 minus Hour 1, but negative .47 for Hour 3 minus Hour 2 in the low condition. This same pattern of reversal is seen for several other scales. At this time, there is no simple explanation for these findings.

Relationship of Combinations of Ability, Personality/Preference, and Job Description Measures with Performance and Work Satisfaction

The prediction of performance in both monitoring tasks was found to be significantly improved when personality/preference measures were combined with the best specific ability predictors. As shown in Table 19, the prediction of total errors in the low job structural attribute condition improved when the Attribute Preference Scale (APS) Variety Scale or the Survey of Work Values (SWV) Extrinsic Scale were combined with the GEFT. The interaction between the GEFT and the SWV Extrinsic Scale made an additional contribution beyond that of the two scales themselves.

In the high job structural attribute condition, the SWV Extrinsic Scale again improved prediction, but its weighting was the opposite of that in the low job structural attribute condition. The only other personality/preference variable to add significantly to the GEFT in the high job structural attribute condition was the Maudsley Personality Inventory (MPI) Extraversion Scale.

Table 18

Correlations of Job Orientation Inventory Scales with Performance Decrements Across Hours by Condition

Increase in Total Errors		Hobbies	Achievement	Responsibility	Growth	Recognition	Status	Interpersonal	Pay	Security	Family
LJSA[a]	Hour 2 -Hour 1	-.01	-.30	-.37*	-.22	-.05	.19	-.22	.48**	.11	.24
	Hour 3 -Hour 2	.10	.30	.29	.29	-.18	-.10	.28	-.47*	-.13	-.22
	Hour 3 -Hour 1	.08	.02	-.05	.09	-.21	.08	.07	-.02	-.03	.00
HJSA[a]	Hour 2 -Hour 1	.00	.25	.24	.02	-.12	-.31	.05	-.29	-.06	-.01
	Hour 3 -Hour 2	-.04	-.08	-.18	.02	.07	-.26	-.28	.30	.01	.25
	Hour 3 -Hour 1	-.03	.15	.07	.03	-.05	-.44*	-.16	-.03	-.05	.17

[a] $n = 28$ per condition.
*$p \leq .05$.
**$p \leq .01$.

Table 19

Combination of the Strongest Specific Ability Predictor (Group Embedded Figures Test) with Personality/Preference Measures to Predict Total Average Errors by Condition[a]

Condition		Predictor	Simple r	Multiple R	Beta	F
LJSA	A. 1)	GEFT	-.69	.69	-.78	
	2)	APS-Preference for Variety	-.11	.76	-.33	17.00***
	B. 1)	GEFT	-.69	.69	-.66	
	2)	SWV-Extrinsic	-.35	.74	-.28	15.48***
	C. 1)	GEFT	-.69	.69	-1.89	
	2)	SWV-Extrinsic	-.35	.74	-.98	
	3)	GEFT x SWVE	-.66	.80	1.50	15.05***
HJSA	A. 1)	GEFT	-.49	.49	-.47	
	2)	SWV-Extrinsic	.39	.61	.36	7.66**
	B. 1)	GEFT	-.49	.49	-.45	
	2)	MPI-Extraversion	.40	.60	.34	7.23**

[a] n = 29 per condition.

*$p < .05$.

**$p < .01$.

Combining a general ability predictor (Wesman) with personality/preference measures resulted in similar improvement in the prediction of performance. The SWV Extrinsic Scale added significantly to prediction of errors in the low job structural attribute condition, while the MPI Extraversion Scale improved the prediction of this criterion in the high job structural attribute condition (Table 20). In addition, combining the SWV Extrinsic and MPI Extraversion scales added significantly to the prediction of performance in the HJSA condition, as shown in Table 21. Furthermore, the motivational dimension of Work Failure (Picture Arrangement Test - PAT) also interacted with the ability measures to predict performance (Table 22) in the HJSA condition.

The favorableness with which the work was evaluated was predicted by various combinations of ability and personality/preference measures. Interestingly, the combination of variables in which the second predictor added significantly to the prediction of work satisfaction in the low job structural attribute condition involved two measures of perceptual style: the GEFT and the RFT (see Table 23). Also, as shown in Table 23, the sum of the described amounts of the core job structural attributes (complexity, variety, responsibility, and external feedback) combined with a specific ability measure, the GEFT, to strongly predict level of work satisfaction in the high job structural attribute condition. While performance was better predicted in the simpler low job structural attribute condition, the favorableness with which the task was evaluated was more strongly predicted in the more complex high job structural attribute condition.

The nature of the relationships among ability and motivational (personality/preference) measures and task performance and satisfaction can be understood by comparing the relationships between certain motivational measures and the

Table 20

Combination of the General Ability Predictor (Wesman) with Personality/Preference Measures to Predict Total Average Errors by Condition[a]

Condition		Predictor	Simple r	Multiple R	Beta	F
LJSA	A.	1) Wesman Total	-.68	.68	-.66	
		2) SWV-Extrinsic	-.35	.74	-.31	15.54***
HJSA	B.	1) Wesman Total	-.47	.47	-.45	
		2) MPI-Extra-version	-.40	.60	.38	7.37**

[a] n=29 per condition.

**$p < .01$.

***$p < .001$.

Table 21

Combination of Personality/Preference Measures to Predict Total Average Errors - HJSA Condition

Condition	Predictor	Simple r	Multiple r	Beta	F
HJSA[a]	MPI - Extraversion	.40	.40	.39	
	SWV - Extrinsic	.39	.56	.38	5.82**

[a] $n = 29$.

** $p < .01$.

Table 22

Combination of Ability Measures with the Picture Arrangement Test to Predict Total Average Errors - HJSA Condition

Condition	Predictor	Simple r	Multiple R	Beta	F
HJSA[a]	1) GEFT	-.49	.49	-.50	
	2) PAT-Work Failure	.37	.63	.39	8.07**
	1) Wesman Total	-.47	.47	-.45	
	2) PAT-Work Failure	.37	.59	.35	6.51**

[a] $n = 28$.

** $p < .01$.

Table 23

Combination of Ability and Personality/Preference Measures as Predictors of Work Satisfaction by Condition[a]

Condition	Predictor	Simple r	Multiple r	Beta	F
LJSA	1) GEFT	-.41	.41	-.65	
	2) RFT	-.16	.58	-.48	6.34**
HJSA	A.1) WI/WE-Description of Core Attributes	.76	.76	.63	
	2) GEFT	-.59	.80	-.29	23.76***
	B.1) Wesman Total	-.41	.41	-.41	
	2) APS - Preference for Complexity	.39	.57	.39	6.33**

[a] $n = 29$ per condition.

** $p < .05$.

*** $p < .001$.

criteria before and after partialling out the strong influence of the ability measure. These relationships are shown in Table 24 for an "intrinsic" preference measure (APS - Variety) and for an "extrinsic" preference (SWV - Earnings). The intrinsic measure relates to work satisfaction, but not performance, before partialling out the effect of ability. The extrinsic measure relates to neither performance nor work satisfaction. When the influence of ability on performance was controlled, it can be seen that these two preference measures were related to performance in the low job structural attribute condition. In contrast, little change occurred in the relationships between motivational measures and work satisfaction when ability was controlled. It is interesting to note that for the intrinsic measures, in the low job structural attribute condition, the relationships between motivation and performance (with ability controlled) are almost identical with the relationships between motivation and work satisfaction.

Finally, the possibility that performance was related to work satisfaction was explored. Table 25 shows the relationships between performance and work satisfaction by condition. When a specific ability measure was partialled out (GEFT), a significant relaltionship was found in the low condition which indicated that high satisfaction was related to good performance.

Discussion

Many experiments have reported wide variation in individual monitoring performance under identical conditions (Davies & Tune, 1060). Buckner (1963) showed that this between-subject variance was stable from session to session. However, it has been suggested that the obtained individual differences in monitoring performance might be task-specific, making it difficult to predict performance from general psychological tests (McGrath, 1963).

Table 24

Simple and Partial Correlations of Preference Measures with Performance and Work Satisfaction by Condition[a]

Preference Measure	Simple Correlation With Errors	Simple Correlation With Satisfaction	Partial Correlation Controlling Ability (GEFT) With Errors	Partial Correlation Controlling Ability (GEFT) With Satisfaction
APS -				
Variety				
LJSA	-.10	.46*	-.44*	.39*
HJSA	-.11	-.39*	-.14	-.38
SWV -				
Earnings				
LJSA	-.33	.08	-.45*	.09
HJSA	.22	.19	.24	.22

[a] $n = 29$ per condition.

*$p < .05$.

Table 25

Relationship Between Performance (Total Average Errors)

And Work Satisfaction by Condition

Condition	Simple Pearson Correlation between Performance and Satisfaction	Partial Correlation Controlling for Ability (GEFT) between Performance and Satisfaction
LJSA[a]	.02	-.40*
HJSA[a]	.28	-.01

[a] $\underline{n} = 29$.

* $\underline{p} < .05$.

In reviewing studies which have related individual attributes to monitoring performance, Davies and Tune (1969) conclude that "although the possibility of devising a selection battery for vigilance performance seems at present remote, few attempts have been made and the problem remains to be extensively explored." Since the time of that review, strong empirical evidence has accumulated indicating that perceptual style relates to performance on a variety of simulated and real world tasks in which monitoring is an essential component (Barrett & Thornton, 1968; Barrett, Thornton & Cabe, 1969; Mihal & Barrett, in press; Thornton, Barrett & Davis, 1968; Harano, 1970; Moses, 1970; Cahoon, 1970; Moore & Gross, 1973). At least one study, however, has not found a significant relationship between perceptual style and vigilance performance (Kennedy, 1972).

The strong expected relationship was found between the measures of perceptual style and the indices of performance in the present monitoring study. These relationships were especially strong for the Group Embedded Figures Test (GEFT) in the low job structural attribute condition. It should also be noted that there was a strong negative relationship between work satisfaction and the GEFT. This indicates that those individuals who were most effective in the monitoring task derived the least satisfaction from it. Results from a recent field study (Barrett, Bass, O'Connor, Alexander, Forbes, & Cascio, 1973) also provide evidence of a high negative correlation between general and specific ability measures and work satisfaction for Naval monitoring personnel. However, additional research will be required before the generalization can be made that with monitoring-type tasks, those people who are most effective also are the ones who will be least satisfied with the task itself.

There was also a very strong relationship between the Rod and Frame measure of perceptual style in errors between hours in both monitoring condition. Those people

who were more field-independent showed the smallest decrements in effective performance.

The significant relationships obtained between general intellectual ability, as measured by the Wesman, and monitoring performance are not consistent with past research which typically has found no such relationships (Davies & Tune, 1969). The obtained relationship may be a function of the specific monitoring task employed in this study, since most previous studies attempting to relate intellectual functioning to performance employed very simple monitoring tasks.

Extrinsic orientation, as measured by the Survey of Work Values, was also related to quality of work in the monitoring task. Again, a differential prediction exists with those higher in extrinsic orientation doing better on the task low in job structural attributes with the reverse being true in the more complex job having higher structural attributes.

A number of interesting relationships were found between satisfaction and job preference and description measures. For instance, the Work Itself-Work Environment (WI/WE) preference for job complexity was not related to performance measures but was negatively related to work satisfaction in the low condition. This would be expected since the low condition did not provide the complexity desired by the subjects with such an orientation.

Different results were obtained for the preference for variety dimension of the WI/WE. Variety was negatively related to work satisfaction in the high condition, but not the low condition. As in the former case, there was no relationship between variety and work performance. Again, the high condition, the higher the preference for variety, the less the job satisfaction experienced by the incumbent.

The sum of the described levels of the core attributes (variety, responsibility, complexity, and external feedback - WI/WE) was strongly related to work satisfaction, but not to performance in the monitoring study. This extremely high relationship (.76) found in the high job structural attribute condition is similar to other research (cf. Lawler, 1969) in the area which indicates that core attributes are related to satisfaction on the job.

Looking at the individual attribute descriptions, it is evident that job complexity was significantly related to work satisfaction, but only in the high condition where those who perceived and described the job as being more complex also received more satisfaction from the task itself. This was not true in the low condition which was designed to be less complex. This would lead one to the generalization that the task must reach a certain level of complexity before any relationship can be found between complexity and satisfaction.

The dimension of variety showed somewhat similar results to the previous findings with complexity. There was a significant relationship between described variety in the job and the work satisfaction received in the high condition. Only external feedback, however, is positively associated with work satisfaction in both monitoring conditions. This finding is interesting since, in reality, in neither condition was any actual feedback given to the individuals during the course of the study nor before they filled out the questionnaire. One is tempted to believe that these associations might be an indication of the degree to which the subjects believed they would receive external feedback. This does not explain the results in the low condition since subjects were explicitly told they would not receive any external feedback.

The dimension of described responsibility was also significantly related to work satisfaction, but again, only in the high condition. Taking the results together, it is evident that, in the high condition, there was a consistent relationship between the description of the job attributes and satisfaction received in performing the task. This was not true in the low condition. Clearly, task characteristics moderated the relationship between the job attributes and work satisfaction.

One of the most interesting findings involved the relationship between performance and work satisfaction when the ability measures were partialled out. The simple zero order correlations between performance and satisfaction were nonsignificant in both the low and high conditions. However, when the GEFT was partialled out, a significant relationship was found in the low condition, indicating that those people who performed better on the task were more satisfied. The absence of a significant relationship in the high condition may reflect the fact that when tasks become too complex and capacities are overloaded, conscious individual effort can have little effect on performance. On less complex tasks, however, effort may make a difference and performance which results from such effort may be satisfying.

The possibility that the complexity of a task is a controlling factor in allowing certain relationships to appear was reinforced by the finding that when ability was partialled out, a relationship was found between certain motivational factors and job performance only in the low condition. For example, a .44 relationship was found between the preference for variety and the quality of performance in the low condition, while a nonsignificant relationship was found between these variables in the high condition.

In conclusion, this study has demonstrated the strong influence of individual attributes upon performance and satisfaction on two monitoring tasks with different job structural attributes. These results refute those conceptualizations of job design which implicitly assume that there are no interactions between individual attributes and job structural attributes.

References

Barrett, G. V., & Thornton, C. L. Relationship between perceptual style and driver reaction to an emergency situation. Journal of Applied Psychology, 1968, 52, 169-176.

Barrett, G. V., Thornton, C. L., & Cabe, P. A. The relation between embedded figures test performance and simulator behavior. Journal of Applied Psychology, 1969, 53, 253-254.

Barrett, G. V., Dambrot, F., & Smith, G. The relationship between individual attributes and job design: Review and annotated bibliography. Technical Report No. 6, 1975. University of Akron, Department of Psychology, Industrial/ Organizational Psychology Group.

Barrett, G. V., Bass, B. M., O'Connor, E. J., Alexander, R. A., Forbes, J. P., & Cascio, W. Relationships among job structural attributes, retention, task descriptions, aptitudes and work values. Technical Report No. 3, 1975. University of Akron, Department of Psychology, Industrial/Organizational Psychology Group.

Bass, B.M. Social behavior and the orientation inventory: A review. Psychological Bulletin, 1967, 65, 260-292.

Blood, M. R. Work values and job satisfaction. Journal of Applied Psychology, 1969, 53, 456-459.

Blood, M. R. Intergroup comparisons of intraperson differences: Rewards from the job. Personnel Psychology, 1973, 26, 1-9.

Blood, M. R., & Hulin, C. L. Alienation, environmental characteristics and worker responses. Journal of Applied Psychology, 1967, 51, 284-290.

Buckner, A. H. An individual-difference approach to explaining vigilance performance. In Buckner, A. H., & McGrath, J. J. (Eds.) Vigilance: A symposium. New York: McGraw-Hill, 1963.

Cascio, W. F. Value orientation, organizational rewards, and job satisfaction. Unpublished doctoral dissertation, University of Rochester, 1973.

Cahoon, R. L. Vigilance performance under hypoxia. Journal of Applied Psychology, 1970, 54, 479-483.

Davies, D. R., & Tune, G. S. Human vigilance performance. New York: American Elsevier, 1969.

Hackman, J. R., & Lawler, E. E., III. Employee reactions to job characteristics. Journal of Applied Psychology, 1971, 55, 259-296.

Harano, R. M. Relationship of field dependence and motor-vehicle accident involvement. Perceptual and Motor Skills, 1970, 31, 272-274.

Herzberg, F. Work and the nature of man. Cleveland: World Publishing, 1966.

Kennedy, R. S. The relationship between habituation to vestibular stimulation and vigilance: Individual differences and subsidiary problems. Monograph No. 20, U.S. Naval Aerospace Medical Research Laboratory, Pensacola, Florida, July, 1972.

Kipnis, D. A noncognitive correlate of performance among lower aptitude men. Journal of Applied Psychology, 1962, 46, 76-80.

Knapp, R. R. The Maudsley Personality Inventory by H. J. Eysenck. San Diego: Educational and Industrial Testing Service, 1962.

Lawler, E. E., III. Job design and employee motivation. Personnel Psychology, 1969, 22, 426-435.

McGrath, J. J. Cross-validation of some correlates of vigilance performance. In Buckner, A. H., & McGrath, J. J. (Eds.) Vigilance: A symposium. New York: McGraw-Hill, 1963.

Mihal, W. L., & Barrett, G. V. Individual differences in perceptual information processing and their relation to automobile accident involvement. (In press)

Moore, S. F., & Gross, S. J. Influence of critical signal regularity, stimulus event matrix, and cognitive style on vigilance performance. Journal of Experimental Psychology, 1973, 99, 137-139.

Moses, J. L. Selecting vigilant types: Predicting vigilance performance by means of a field dependence test. Experimental Publication System, 1970, 4, Ms. No. 151B.

Saleh, S. D. A study of attitude change in the preretirement period. Journal of Applied Psychology, 1964, 48, 310-312.

Saleh, S. D. Anxiety as a function of intrinsic-extrinsic job orientation, the presence or absence of observers, and task difficulty. Journal of Applied Psychology, 1971, 35, 542-548.

Smith, P. C., Kendall, L. M., & Hulin, C. L. The measurement of satisfaction in work and retirement. Chicago: Rand McNally, 1969.

Thornton, C. L., Barrett, G. V., & Davis, J. A. Field independence and target identification. Human Factors, 1968, 10, 493-496.

Tomkins, S. S., & Miner, J. B. The Tomkins-Horn Picture Arrangement Test. New York: Springer, 1957.

Turner, A. N., & Lawrence, P. R. Industrial jobs and the worker. Boston: Harvard University Graduate School of Business Administration, 1965.

Walker, C. R., & Guest, R. H. The man on the assembly line. Cambridge, Mass.: Harvard University Press, 1952.

Wesman, A. G. Wesman Personnel Classification Test - Manual. New York: The Psychological Corporation, 1965.

Witkin, H. A., Oltman, P. K., Raskin, E., & Karp, S. A. A manual for the Embedded Figures Test. Palo Alto, Cal.: Consulting Psychologists Press, 1971.

Witkin, H. A., Lewis, H. B., Hertzman, M., Machover, K., Meissner, P. M., & Wapner, S. Personality through perception. New York: Harper, 1954.

Wollack, S., Goodale, J. G., Witjing, J. P., & Smith, P. C. Development of the Survey of Work Values. Journal of Applied Psychology, 1971, 55, 331-338.

Appendix A

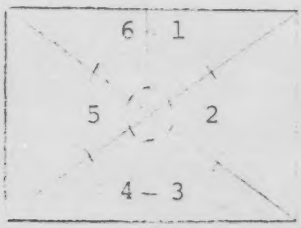
Instructions for Simple and Complex Monitoring Tasks

Instructions for Simple Task

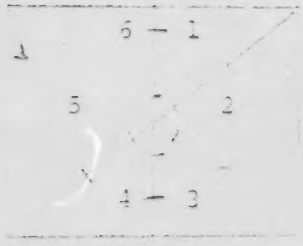
This is a simulation of a visual monitoring job, such as that of a radar operator. Treat it as if it were a real job. We are interested in measuring how people perform on such tasks over time.

The job requires you to detect and record the location and the inward movement of a particular geometric symbol, in this case a triangle. There will be many symbols on the screen, one of which may be a triangle. There will be times when there is no triangle.

You are to detect and mentally note the location of any triangles with respect to the following six areas on the screen:



When you detect the first triangle you should press button #7 and remember its location until the next time a triangle appears. If, the very next time one appears, it is in the same area but closer to the center of the screen, you are to record its location by pressing the button whose number corresponds to the



number of that area. For example, (see Figure, p.1) you may note a triangle in area 5. You should respond by pressing button #7. If the next triangle detected is also in area 5 and is closer to the center of the screen (as illustrated) press button #5.

If the next triangle is not in the same area or is not closer to the center again press button #7. Now remember the location of the new triangle. Always compare the position of the present triangle only with the position of the triangle that came immediately before it. This means you only have to remember the position of one triangle at a time.

The rules can be summed up as follows:

> If a triangle has moved inward, in the same area as the previous triangle, record the location. If not, press button #7 to indicate the presence of the triangle. Make no response if no triangle is present.

You should remember the location of the very last triangle until your screen goes completely blank. When this happens, it is a signal to start the process over again. Forget the last triangle and look for the first triangle after the blank screen. Then compare the location of the following triangle to this new triangle and continue as before.

Both speed and accuracy are important in this task. However, each of you will be monitoring the same area. Therefore, you will all be seeing exactly the same signals on the screen at the same time. It is only necessary for one of you to detect a signal for the system to operate properly. Please be as certain as you possible can of your response before you make it.

We are only interested in the operation of the overall system and will be recording only instances where none of you make the correct response. Therefore, it will be impossible to give you information on how well you have done individually.

We suggest that you sit squarely in front of the screen, with the Response Button Console directly in front of you. You may, however, move the Console to the position most comfortable for you. Use only one hand to press the response buttons. Your performance will be best if you keep your hand poised slightly above or below the row of seven buttons when not responding.

There will be periodic breaks, however, if you must leave the room while slides are being presented, press button #7 three times before you leave and twice when you return.

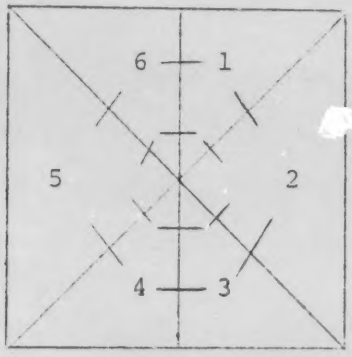
When you finish reading these instructions, put your headphones on and we will begin with a practice session.

Instructions for Complex Task

This is a simulation of a visual monitoring job, such as that of a radar operator. Treat it as if it were a real job. We are interested in measuring how people perform on such tasks over time.

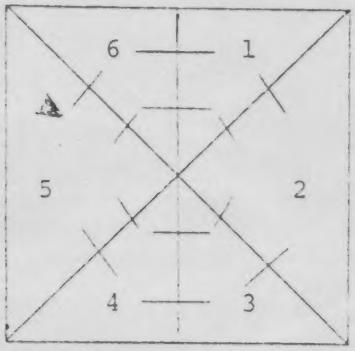
The job requires you to detect and record the movement of three different symbols. You should respond to the inward movement of triangles, to the outward movement of circles, and to the clockwise movement of cloverleaf-shaped objects.

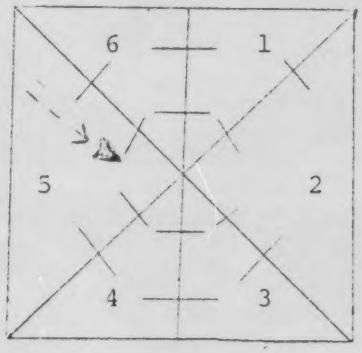
You are to detect and mentally note the location of these symbols with respect to the following six areas on the screen:



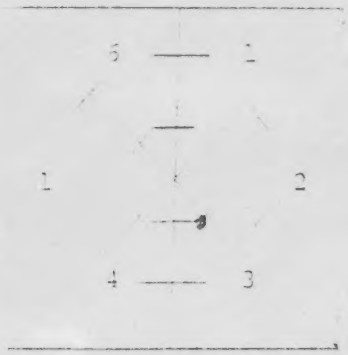
When you first detect a triangle or a circle or a cloverleaf, you should press button #7 and remember its location until the next time a similar symbol appears. If, the very next time a triangle appears, it is in the same area and closer to the center of the screen, you are to record its location by pressing the button whose number corresponds to the number of that area. For example, (see Figure below) you may note a triangle in area 5. You should respond by pressing button #7. If the next triangle detected is also in area 5 and is closer to the center of the screen (as illustrated) press button #5.

If the next triangle is not in the same area or is not closer to the center again press button #7. Now remember the location of the new triangle. Always compare the position of the present triangle only with the position of the triangle that came immediately before it. This means you only have to remember the position of one triangle at a time.

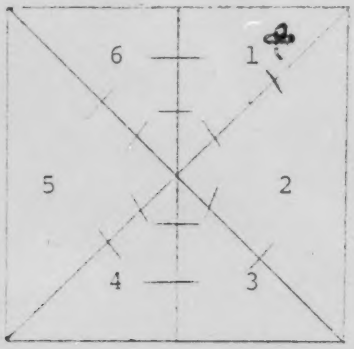


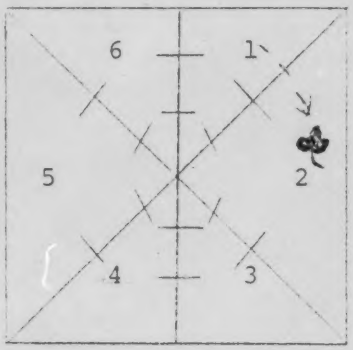


Similarly, if you have a circle in mind and the very next circle is in the same area, but farther from the center of the screen, you are to record its location by pressing the button whose number corresponds to the number at that area. For example (see Figure below) you may note a circle in Area 3. Your response to the first circle would be to press button #7. If the next circle is also in Area 3 and is farther from the center of the screen as illustrated) press button #3. If the next circle is not in the same area or is not farther from the center, again press button #7.



The response to the cloverleaf is slightly different. In this case, record the location only if the cloverleaf has moved to the next adjacent area in the clockwise direction. For example (see Figure below) you may note a cloverleaf in Area 1. (Press button #7)





If the next cloverleaf detected is in Area 2 (the next area in the clockwise direction) respond by pressing button #2 (the button corresponding to the area to which the cloverleaf has moved).

Do not be concerned about the distance of the cloverleaf from the center of the screen. Pay attention only to the area that it is in. If the cloverleaf moves more than one area at a time or if it moves counter clockwise, press button #7.

The rules can be summed up as follows:

If a triangle moves inward, in the same area as the previous triangle, record the location.

If a circle moves outward, in the same area as the previous circle, record the location.

If a cloverleaf moves clockwise, record the location.

Any symbol that has not moved in the above fashion should be responded to by pressing button #7.

Make no response if no triangle, circle, or cloverleaf is present.

In order to do this task, you must simultaneously keep in mind the very last position of the triangle, the circle, and the cloverleaf.

You should remember these locations until your screen goes completely blank. When this happens, it is a signal to start the precess over again. Forget the previous locations and look for the first triangle, circle, and cloverleaf. Then compare the location of the following symbols to these and continue as before.

Both speed and accuracy are important in this task. Each of you will be solely responsible for your own individual area. You must all detect all signals for the system to operate properly. Please be as certain as you possible can of your response before you make it.

All of your responses will be recorded and you will be told how well you have done at the very end of the session.

We suggest that you sit squarely in front of the screen, with the response button console directly in front of you. You may, however, move the console to the position most comfortable for you.

Use only one hand to press the response buttons. Your performance will be best if you keep your hand poised slightly above or below the row of seven buttons when not responding.

There will be periodic break, however, if you must leave the room while slides are being presented, press button #7 three times

before you leave and twice when you return.

When you finish reading these instructions, put your headphones on and we will begin with a practice session.

Appendix B

Performance by Hour

and

Analyses of Variance

Table 26

Average Performance (per slide tray)
for the LJSA and HJSA Conditions
Broken Down by Hour

	Number Of Cases	Mean	Standard Deviation	t Value
Reaction Times (sec.)				
Hour 1				
LJSA	29	2.48	.61	-4.08***
HJSA	26	3.09	.50	
Hour 2				
LJSA	29	2.47	.56	-3.83***
HJSA	26	3.02	.50	
Hour 3				
LJSA	29	2.41	.56	-4.34***
HJSA	26	3.02	.46	
False Alarms				
Hour 1				
LJSA	29	.22	.30	-3.84***
HJSA	29	.76	.70	
Hour 2				
LJSA	29	.14	.20	-3.84***
HJSA	29	.53	.52	
Hour 3				
LJSA	29	.23	.29	-1.95
HJSA	29	.50	.67	

Table 26 (Cont'd.)

	Number Of Cases	Mean	Standard Deviation	t Value
Missed Signals				
Hour 1				
LJSA	29	2.26	1.76	
HJSA	29	6.26	2.58	-6.92***
Hour 2				
LJSA	29	2.58	2.38	
HJSA	29	5.10	2.82	-3.67***
Hour 3				
LJSA	29	2.70	2.64	
HJSA	29	5.96	3.64	-3.91***
Incorrect Responses				
Hour 1				
LJSA	29	2.16	1.62	
HJSA	29	5.76	2.54	-6.45***
Hour 2				
LJSA	29	2.48	1.82	
HJSA	29	5.42	2.16	-6.07***
Hour 3				
LJSA	29	2.52	1.80	
HJSA	29	5.20	2.52	-4.70***

*** $p < .001$.

Table 27

Analysis of Variance of Response Times

Source	df	MS	F
Between subjects	51		
A (conditions)	1	53.17	16.31***
Subj. w. groups	50	3.26	
Within subjects	572		
B (hours)	2	.19	1.04
AB	2	.08	.41
B x subj. w. groups	100	.19	
C (time period within hours)	3	.36	4.43**
AC	3	.38	4.76**
C x subj. w. groups	150	.08	
BC	6	.32	4.61***
ABC	6	.20	2.90**
BC x subj. w. groups	300	.07	

** $p < .01$.

*** $p < .001$.

Table 28

Analysis of Variance of False Alarms

Source	df	MS	F
Between subjects	57		
A (conditions)	1	28.16	23.06***
Subj. w. groups	56	1.22	
Within subjects	638		
B (hours)	2	1.78	2.05
AB	2	1.10	2.21
B x subj. w. groups	112	.72	
C(time period within hours)	3	.87	1.72
AC	3	.09	.17
C x subj. w. groups	168	.51	
BC	6	.93	1.81
ABC	6	.30	.59
BC x subj. w. groups	336	.51	

*** $p < .001$.

Table 29

Analysis of Variance of Incorrect Responses

Source	df	MS	F
Between subjects	57		
A (conditions)	1	1629.63	36.63***
Subj. w. groups	56	44.48	
Within subjects	638		
B (hours)	2	5.24	1.32
AB	2	15.52	3.90*
B x subj. w. groups	112	3.98	
C (time period within hours)	3	5.33	1.57
AC	3	8.00	2.35
C x subj. w. groups	168	3.40	
BC	6	7.08	2.49*
ABC	6	3.78	1.33
BC x subj. w. groups	336	2.85	

*$p < .05$.

***$p < .001$.

Table 30

Analysis of Variance of Missed Signals

Source	df	MS	F
Between subjects	57		
A (conditions)	1	1831.38	28.42***
Subj. w. groups	56	64.44	
Within subjects	638		
B (hours)	2	14.41	1.27
AB	2	34.54	3.04+
B x subj. w. groups	112	11.37	
C (time period within hours)	3	10.12	1.91
AC	3	6.99	1.32
C x subj. w. groups	168	5.29	
BC	6	9.53	2.41*
ABC	6	4.74	1.20
BC x subj. w. groups	336	3.95	

+ $p < .10$.

* $p < .05$.

*** $p < .001$.

Table 31

Descriptions on Work Itself/Work Environment Questionnaire of the LJSA and HJSA Conditions[a] after Performing the Task

	LJSA Condition		HJSA Condition		
	M	SD	M	SD	t
Variety	1.95	.98	2.16	1.04	-.78
Attention	3.67	1.11	3.84	1.2	-.56
Learning New Skills	2.05	1.35	2.05	1.18	0
Task Identity	3.21	1.17	3.09	1.32	.71
Internal Feedback	2.47	1.27	2.69	1.35	-.65
Independence	1.91	1.03	2.26	1.37	-1.08
Responsibility	3.07	1.02	2.94	1.39	.38
Order	3.78	.99	4.00	1.13	-.80
Goal Clarity	4.37	1.06	4.04	1.07	1.19
Job Difficulty	2.05	.69	2.47	1.13	-1.69
Job Complexity	1.90	.77	2.50	1.22	-2.25 *
Decision Making	2.72	1.29	2.58	1.36	.42
External Feedback	1.10	.39	1.74	1.22	-2.68 **
Intrinsic Interest	1.90	.94	1.90	1.17	0
Intrinsic Motivation	1.50	.82	1.68	1.06	-.79
Pay	2.32	.89	2.52	.91	.44
Physical Working Conditions	3.24	.98	2.91	.79	1.40
Administrative Working Conditions	3.36	.92	3.30	.90	.24
Work Scheduling	3.41	.70	3.71	.70	-1.60
Job/Person Fit	2.76	.82	2.81	1.15	-.20

[a] $n = 29$. * $p < .05$ (two-tailed tests). ** $p < .01$ (two-tailed tests).

Appendix D

Table 32

Correlations of Job Attitude Scale With

Response Times, Errors

and Satisfaction by Condition[a]

	Response Time	False Alarms	Missed Signals	Incorrect Responses	Total Errors	Work Satisfaction
Intrinsic						
HJSA	- .11	.09	-.09	.23	.09	.25
LJSA	- .06	.25	.02	- .22	-.06	- .10
Extrinsic						
HJSA	.11	- .09	.09	- .23	- .09	- .25
LJSA	.06	- .25	-.02	.22	.06	.10

[a] $n = 28$ for both groups except for HJSA Response Time where $n = 25$.

Appendix E

Table 33

Correlations of Job Orientation Inventory Scales With Response Times, Errors, and Satisfaction by Condition[a]

	Response Time	False Alarms	Missed Signals	Incorrect Responses	Total Errors	Work Satisfaction
Hobbies						
HJSA	.12	-.26	-.01	.14	.03	-.25
LJSA	.10	-.44*	.07	.07	.12	-.13
Achievement						
HJSA	-.10	.06	.21	-.18	.06	.14
LJSA	-.22	.08	.08	.04	.07	.41*
Responsibility						
HJSA	-.30	-.01	-.13	-.20	-.22	.13
LJSA	.26	.15	.21	.26	.26	-.17
Growth						
HJSA	.09	.08	-.29	.11	-.12	.05
LJSA	-.17	-.12	.03	.00	.00	.11
Recognition						
HJSA	.00	.03	-.04	.08	.03	.00
LJSA	.13	-.01	-.26	.16	-.12	.21
Status						
HJSA	.07	-.31	-.20	-.21	-.35	.03
LJSA	.20	-.11	-.04	.17	.04	-.41*

Table 33

(Continued)

	Response Time	False Alarms	Missed Signals	Incorrect Responses	Total Errors	Work Satisfaction
Interpersonal Relations						
HJSA	- .05	.20	.11	.27	.29	.10
LJSA	.21	- .17	.23	.36	.29	- .19
Pay						
HJSA	.07	.09	.06	.01	.07	.03
LJSA	- .19	.30	- .18	- .22	- .18	.16
Job Security						
HJSA	.20	- .14	-.02	- .13	- .13	- .40*
LJSA	- .18	.12	- .09	.05	- .01	.02
Family						
HJSA	- .13	.26	.04	- .01	.08	.37*
LJSA	- .14	.22	- .13	- .42*	- .28	- .06

[1] $n = 28$ for both groups except for HJSA Response Time where $n = 25$.

*$p < .05$.

Appendix F

Table 34

Correlations of Orientation Inventory with Response Times, Errors, and Satisfaction by Condition[a]

	Response Time	False Alarms	Missed Signals	Incorrect Responses	Total Errors	Work Satisfaction
Self						
HJSA	.01	- .13	.18	- .02	.08	.12
LJSA	.12	- .21	.04	.39*	.18	.02
Persons						
HJSA	.01	.18	.09	.02	.12	- .27
LJSA	.07	.19	.20	- .04	.12	.04
Task						
HJSA	- .22	- .34	- .27	.07	- .22	- .30
LJSA	.10	- .29	.04	- .12	- .06	- .26

[a] n = 20 for both groups except for HJSA Response Time where n = 26.

*$p < .05$.

Appendix G

Table 35

Correlations of Protestant Ethic Scale

With Response Times, Errors and Satisfaction by Condition[a]

	Response Time	False Alarms	Missed Signals	Incorrect Responses	Total Errors	Work Satisfaction
Pro-Protestant Ethic						
HJSA	- .21	.13	.20	.10	.23	.11
LJSA	- .18	.26	- .30	- .36	- .32	- .02
Non-Protestant Ethic						
HJSA	- .27	.09	.32	.17	.35	- .20
LJSA	- .09	- .18	- .03	.06	- .01	.15

[a] $n = 29$ for both groups except for HJSA Response Time where $n = 26$.

Appendix H

Table 36

Correlations of Work Itself/Work Environment Job Structural Preferences, Descriptions, and the Absolute Value of the Difference with Response Time, Errors and Satisfaction by Condition[a]

	Response Time	False Alarms	Missed Signals	Incorrect Responses	Total Errors	Work Satisfaction
Sum of Variety, Responsibility, Job Complexity, External Feedback Described						
HJSA	-.15	.36	.09	.28	.31	.76***
LJSA	-.20	.36	.29	.22	.32	.42*
Preferred						
HJSA	-.01	-.10	.19	.11	.18	.14
LJSA	-.12	.23	-.32	-.41*	-.35	.04
Absolute Difference						
HJSA	.17	-.36	-.05	-.18	-.29	-.57***
LJSA	.09	-.01	-.37*	-.43*	-.42*	-.31**

Table 36 (Cont'd)

	Response Time	False Alarms	Missed Signals	Incorrect Responses	Total Errors	Work Satisfaction
Job Complexity Described						
HJSA	- .08	.42*	- .01	.44*	.35	.53**
LJSA	- .29	.28	.21	.10	.20	.16
Job Complexity Preferred						
HJSA	- .14	- .13	.14	- .01	.07	.21
LJSA	- .19	.38*	- .31	- .21	- .24	- .43*
Absolute Difference						
HJSA	.09	- .23	.06	- .09	- .06	- .16
LJSA	.12	.03	- .39*	- .23	- .34	- .44*
External Feedback Described						
HJSA	- .14	.31	.21	.22	.35	.62***
LJSA	.22	.12	.05	.06	.07	.61***
External Feedback Preferred						
HJSA	- .03	.10	.18	.18	.26	.34
LJSA	- .09	.09	- .13	- .46*	- .21	.26
Absolute Difference						
HJSA	.16	- .12	- .11	- .12	- .17	- .25
LJSA	- .17	.14	- .22	- .34**	- .28*	- .00

Table 36 (Cont'd)

	Response Time	False Alarms	Missed Signals	Incorrect Responses	Total Errors	Work Satisfaction
Variety - Described						
HJSA	- .02	.26	.15	.21	.30	.48***
LJSA	- .08	.36	.31	.17	.30	.36
Variety - Preferred						
HJSA	- .03	- .45*	- .12	- .03	- .21	-.56**
LJSA	-0.10	.03	- .27	- .36	- .32	.08
Absolute Difference						
HJSA	- .02	- .49**	- .24	- .23	- .42*	- .56***
LJSA	- .01	- .04	- .19	- .26	- .24	- .60***
Responsibility Described						
HJSA	- .18	.09	- .06	- .01	- .03	.62***
LJSA	- .28	.26	.23	.28	.30	.31
Responsibility Preferred						
HJSA	.16	.21	.27	.12	.31	.35
LJSA	.20	.29	- .10	.08	.21	.09
Absolute Difference						
HJSA	.33	- .04	.21	.00	.14	- .42*
LJSA	.23	- .04	- .24	- .22	- .25	- .38*

Table 36 (Cont'd)

	Response Time	False Alarms	Missed Signals	Incorrect Responses	Total Errors	Work Satisfaction
Attention - Described						
HJSA	.17	.03	.09	.03	.09	- .05
LJSA	.04	- .22	.08	.10	.07	.15
Attention - Preferred						
HJSA	.17	.13	.16	.10	.20	.24
LJSA	.07	.04	.01	.00	.01	.16
Absolute Difference						
HJSA	.39	- .18	- .13	.09	- .08	- .30
LJSA	- .30	.07	- .19	- .16	- .18	- .23
Decision Making Described						
HJSA	.11	.29	.24	.05	.27	.34
LJSA	- .18	.06	.04	- .01	.02	.36
Decision Making Preferred						
HJSA	- .29	.15	.09	.22	.23	.10
LJSA	- .06	.40*	- .01	- .29	- .27	- .40*
Absolute Difference						
HJSA	- .09	- .27	- .08	- .17	- .14	- .41*
LJSA	.14	- .19	- .34	- .29	- .36	- .29

Table 36 (Cont'd)

	Response Time	False Alarms	Missed Signals	Incorrect Responses	Total Errors	Work Satisfaction
Goal Clarity Described						
HJSA	- .17	- .04	- .03	- .12	- .10	.17
LJSA	- .31	- .07	- .05	- .22	- .14	- .24
Goal Clarity Preferred						
HJSA	.04	.16	- .15	- .10	- .13	.19
LJSA	.06	.21	- .10	- .17	- .12	- .13
Absolute Difference						
HJSA	- .12	.00	- .05	- .02	- .05	.27
LJSA	.30	.01	- .20	- .13	- .18	.02
Order Described						
HJSA	- .16	- .27	.11	- .24	- .13	- .09
LJSA	.02	.09	.16	.16	.18	- .24
Order Preferred						
HJSA	.14	.10	.01	.04	.05	.07
LJSA	- .28	.28	.26	.32	.26	.19
Absolute Difference						
HJSA	- .13	.11	- .08	.11	.04	.29
LJSA	.07	- .03	- .04	- .01	- .03	.13

Table 36 (Cont'd)

	Response Time	False Alarms	Missed Signals	Incorrect Responses	Total Errors	Work Satisfaction
Independence Described						
HJSA	- .04	.14	.40*	.20	.44*	.34
LJSA	- .10	- .04	- .12	- .07	- .11	.20
Independence Preferred						
HJSA	- .14	.06	.34	.18	.36	.10
LJSA	- .07	.02	- .29	- .17	- .25	.18
Absolute Difference						
HJSA	- .05	- .08	- .13	- .06	- .15	- .22
LJSA	.04	.02	- .16	- .11	- .14	.00
Internal Feedback Described						
HJSA	- .10	.10	.33	.21	.39	.58***
LJSA	- .02	.33	.19	.30	.29	-.05
Internal Feedback Preferred						
HJSA	.09	.03	- .01	.04	.02	-.00
LJSA	- .16	.01	- .17	- .11	- .12	.17
Absolute Difference						
HJSA	- .13	- .06	- .13	- .06	- .13	- .27
LJSA	.02	- .26	- .15	- .24	- .22	.06

Table 36 (Cont'd)

	Response Time	False Alarms	Missed Signals	Incorrect Responses	Total Errors	Work Satisfaction
Task Identity Described						
HJSA	.04	- .09	.02	.00	- .01	.18
LJSA	.23	.21	.49**	.45*	.52**	.24
Task Identity Preferred						
HJSA	- .09	- .14	- .26	.22	- .09	.01
LJSA	.04	.22	.14	- .12	.05	.09
Absolute Difference						
HJSA	- .02	.01	- .02	- .01	- .02	- .33
LJSA	- .09	- .11	- .50**	- .38*	- .48**	- .33
Learning new skills Described						
HJSA	- .19	.23	.14	.27	.31	.56**
LJSA	- .02	- .02	.31	.49**	.41*	.46*
Preferred						
HJSA	- .22	- .05	- .03	.24	.12	.21
LJSA	- .02	.10	.06	.05	.07	.28
Absolute Difference						
HJSA	- .14	- .26	- .18	- .22	- .19	- .02
LJSA	- .02	.27	- .29	- .38	- .31	- .28

Table 36 (Cont'd)

	Response Time	False Alarms	Missed Signals	Incorrect Responses	Total Errors	Work Satisfaction
Job Difficulty Described						
HJSA	.15	.10	.00	.23	.16	.18
LJSA	.13	.14	.20	.12	.19	.46*
Job Difficulty Preferred						
HJSA	.08	.04	.31	.03	.24	- .05
LJSA	.19	.07	- .33	- .24	- .30	- .11
Absolute Difference						
HJSA	- .01	- .16	.20	- .23	- .03	- .30
LJSA	.04	.10	- .42*	- .29	- .37*	- .32
Intrinsic Motivation Described						
HJSA	- .29	.40*	.30	.03	.32	.61***
LJSA	- .15	.09	.32	.15	.27	.17
Intrinsic Motivation Preferred						
HJSA	- .21	- .01	.02	.09	.07	.14
LJSA	- .00	- .02	- .13	- .08	- .07	.10
Absolute Difference						
HJSA	- .10	- .22	- .19	.00	- .19	.11
LJSA	- .19	.05	- .19	- .28	- .24	- .17

Table 36 (Cont'd)

	Response Time	False Alarms	Missed Signals	Incorrect Responses	Total Errors	Work Satisfaction
Work Scheduling Described						
HJSA	.08	- .26	.48**	- .13	.20	- .32
LJSA	- .04	.02	- .02	.03	.01	- .31
Work Scheduling Preferred						
HJSA	.13	- .26	.25	- .15	.02	.18
LJSA	.07	- .23	.12	.28	.18	- .09
Absolute Difference						
HJSA	.07	- .08	.20	.00	.12	- .33
LJSA	.07	- .13	- .16	- .17	- .19	- .27
Administrative Working Time Conditions Described						
HJSA	- .13	.25	- .17	.28	.10	.38*
LJSA	.06	.02	.35	.28	.34	.04
Administrative Working Time Conditions Preferred						
HJSA	.07	.16	.03	.21	.13	.08
LJSA	- .11	.19	.22	.24	.22	.22
Absolute Difference						
HJSA	- .13	- .04	.10	- .07	.02	.29
LJSA	- .01	.22	-.33	- .24	- .27	.03

Table 36 (Cont'd)

	Response Time	False Alarms	Missed Signals	Incorrect Responses	Total Errors	Work Satisfaction
Physical Working Conditions Described						
HJSA	- .07	- .08	.37*	- .18	.13	.01
LJSA	- .04	- .03	.21	.11	.17	.24
Physical Working Conditions Preferred						
HJSA	- .16	.04	.07	.05	.09	- .18
LJSA	.05	.31	.35	- .01	.24	.13
Absolute Difference						
HJSA	- .10	.16	- .19	.17	.01	- .20
LJSA	.10	.23	- .00	- .03	.01	- .18
Pay Described						
HJSA	- .05	- .09	.22	- .36	- .08	.14
LJSA	.02	- .14	.02	- .06	- .03	- .18
Pay Preferred						
HJSA	- .06	- .01	.04	.26	.09*	.01
LJSA	.11	.08	.23	.10	.20	.28
Absolute Difference						
HJSA	- .08	- .13	.29	.22	.12	.01
LJSA	.19	.01	- .02	- .06	- .04	.38*

[a] $n = 29$ except for HJSA Response Time where $n = 26$.

* $p < .05$.
** $p < .01$.
*** $p < .001$.

Appendix I

Table 37

Correlation Matrix of Criterion Measures for the LJSA condition[a]

	Response Time	False Alarms	Missed Signals	Incorrect Responses	Total Errors	Work Satisfaction
Response Time		-.30	.34	.44*	.37*	-.14
False Alarms			.12	.00	.19	-.02
Missed Signals				.72***	.94***	.04
Incorrect Responses					.90***	.00
Total Errors						.02
Work Satisfaction						

[a] $n = 29$.

* $p < .05$.

*** $p < .001$.

Appendix I

Table 38

Correlation Matrix of Criterion Measures for the HJSA conditon[a]

	Response Time	False Alarms	Missed Signals	Incorrect Responses	Total Errors	Work Satisfaction
Response Time		-.02	.10	.11	.13	-.10
False Alarms			-.05	.52**	.50**	.46*
Missed Signals				-.05	.67***	-.05
Incorrect Responses					.69***	.35
Total Errors						.28
Work Satisfaction						

[a] n = 29 except for correlations with Response Time where n = 26.

*$p < .05$.

**$p < .01$.

***$p < .001$.

DISTRIBUTION LIST

Navy

4 Dr. Marshall J. Farr, Director
Personnel and Training Research Programs
Office of Naval Research (Code 458)
Arlington, VA 22217

1 ONR Branch Office
495 Summer Street
Boston, MA 02210
ATTN: Research Psychologist

1 ONR Branch Office
1030 East Green Street
Pasadena, CA 91101
ATTN: E.E. Gloye

1 ONR Branch Office
536 South Clark Street
Chicago, IL 60605

1 Office of Naval Research
Area Office
207 West 24th Street
New York, NY 10011

6 Director
Naval Research Laboratory
Code 2627
Washington, DC 20390

12 Defense Documentation Center
Cameron Station, Building 5
5010 Duke Street
Alexandria, VA 22314

1 Special Assistant for Manpower
OASN (M&RA)
Pentagon, Room 4E794
Washington, DC 20350

1 LCDR Charles J. Theisen, Jr. MSC, USN 4024
Naval Air Development Center
Warminster, PA 18974

1 Chief of Naval Reserve
Code 3055
New Orleans, LA 70146

1 Navy Personnel Research and Development Center
Code 9041
San Diego, CA 92152
ATTN: Dr. J.D. Fletcher

1 Dr. Lee Miller
Naval Air Systems Command
AIR-413E
Washington. DC 20361

1 CAPT John F. Riley, USN
Commanding Officer
U.S. Naval Amphibious School
Coronado, CA 92155

1 Chief
Bureau of Medicine & Surgery
Research Division (Code 713)
Washington, DC 20372

1 Chairman
Behavioral Science Department
Naval Command & Management Division
U.S. Naval Academy
Luce Hall
Annapolis, MD 21402

1 Chief of Naval Education & Training
Naval Air Station
Pensacola, FL 32508
ATTN: CAPT Bruce Stone, USN

1 Mr. Arnold Rubinstein
Naval Material Command (NAVMAT 03424)
Room 820, Crystal Plaza #6
Washington, DC 20360

1 Commanding Officer
Naval Medical Neuropsychiatric Research Unit
San Diego, CA 92152

1 Director, Navy Occupational Task Analysis Program (NOTAP)
Navy Personnel Program Support Activity
Building 1304, Bolling AFB
Washington, DC 20336

1 Dr. Richard J. Niehaus
Office of Civilian Manpower Management
Code 06A
Washington, DC 20390

1 Department of the Navy
Office of Civilian Manpower Management
Code 263
Washington, DC 20390

1 Chief of Naval Operations (OP-987E)
Department of the Navy
Washington, DC 20350

1 Superintendent
Naval Postgraduate School
Monterey, CA 93940
ATTN: Library (Code 2124)

1 Commander, Navy Recruiting Command
4015 Wilson Boulevard
Arlington, VA 22203
ATTN: Code 015

1 Mr. George N. Graine
Naval Ship Systems Command
SHIPS 047C12
Washington, DC 20362

1 Chief of Naval Technical Training
Naval Air Station Memphis (75)
Millington, TN 38054
ATTN: Dr. Norman J. Kerr

1 Dr. William L. Maloy
Principal Civilian Advisor for Education & Training
Naval Training Command,
Code 01A
Pensacola, FL 32508

1 Dr. Alfred F. Smode, Staff Consultant
Training Analysis & Evaluation Group
Naval Training Equipment Center
Code N-00T
Orlando, FL 32813

1 Dr. Hanns H. Wolff
Technical Director (Code N-2)
Naval Training Equipment Center
Orlando, FL 32813

1 Chief of Naval Training Support
Code N-21
Building 45
Naval Air Station
Pensacola, FL 32508

1 Navy Personnel R&D Center
San Diego, CA 92152

5 Navy Personnel R&D Center
San Diego, CA 92152
ATTN: Code 10

Army

1 Headquarters
U.S. Army Administration Center
Personnel Administration Combat
Development Activity
ATCP-HRO
Ft. Benjamin Harrison, IN 46249

1 Director of Research
U.S. Army Armor Human Research
Unit
Building 2422 Morade Street
Fort Knox, KY 40121
ATTN: Library

1 Commandant
United States Army Infantry School
Fort Benning, GA 31905
ATTN: ATSH-DET

1 Deputy Commander
U.S. Army Institute of
Administration
Fort Benjamin Harrison, IN 46216
ATTN: EA

1 Dr. Stanley L. Cohen
U.S. Army Research Institute
1300 Wilson Boulevard
Arlington, VA 22209

1 Dr. Ralph Dusek
U.S. Army Research Institute
1300 Wilson Boulevard
Arlington, VA 22209

1 Mr. Edmund F. Fuchs
U.S. Army Research Institute
1300 Wilson Boulevard
Arlington, VA 22209

1 Dr. J.E. Uhlaner, Technical
Director
U.S. Army Research Institute
1300 Wilson Boulevard
Arlington, VA 22209

1 HQ USAREUR & 7th Army
ODCSOPS
USAREUR Director of GED
APO New York 09403

Air Force

1 Research Branch
AF/DPMYAR
Randolph AFB, TX 78148

1 AFHRL/DOJN
Stop #63
Lackland AFB, TX 78236

1 Dr. Martin Rockway (AFHRL/TT)
Lowry AFB
Colorado 80230

1 Major P.J. DeLeo
Instructional Technology Branch
AF Human Resources Laboratory
Lowry AFB, CO 80230

1 AFOSR/NL
1400 Wilson Boulevard
Arlington, VA 22209

1 Commandant
USAF School of Aerospace Medicine
Aeromedical Library (SUL-4)
Brooks AFB, TX 78235

1 Dr. Sylvia R. Mayer (MCIT)
Headquarters Electronic Systems
Division
LG Hanscom Field
Bedford, MA 01730

1 AFHRL/PE
Stop #63
Lackland AFB, TX 78236

Marine Corps

1 Mr. E.A. Dover
Manpower Measurement Unit
(Code MPI)
Arlington Annex, Room 2413
Arlington, VA 20380

1 Commandant of the Marine Corps
Headquarters, U.S. Marine Corps
Code MPI-20
Washington, DC 20380

1 Director, Office of Manpower
Utilization
Headquarters, Marine Corps
(Code MPU)
MCB (Building 2009)
Quantico, VA 22134

1 Dr. A.L. Slafkosky
Scientific Advisor (Code RD-1)
Headquarters, U.S. Marine Corps
Washington, DC 20380

Coast Guard

1 Mr. Joseph J. Cowan, Chief
Psychological Research Branch
(G-P-1/62)
U.S. Coast Guard Headquarters
Washington, DC 20590

Other DOD

1 Lt. Col. Henry L. Taylor, USAF
Military Assistant for Human
Resources
OAD (E&LS) ODDR&E
Pentagon, Room 3D129
Washington, DC 20301

1 Dr. Harold F. O'Neil, Jr.
Advanced Research Projects Agency
Human Resources Research Office
1400 Wilson Boulevard, Room 625
Arlington, VA 22209

1 Helga L. Yeich
Advanced Research Projects
Agency
Manpower Management Office
1400 Wilson Boulevard
Arlington, VA 22209

Other Government

1 Dr. Lorraine D. Eyde
Personnel Research and Development
Center
U.S. Civil Service Commission
1900 E. Street, N.W.
Washington, DC 20415

1 Dr. William Gorham, Director
Personnel Research and Development
Center
U.S. Civil Service Commission
1900 E. Street, N.W.
Washington, DC 20415

1 Dr. Vern Urry
Personnel Research and Development
Center
U.S. Civil Service Commission
1900 E. Street, N.W.
Washington, DC 20415

1 U.S. Civil Service Commission
Federal Office Bldg.
Chicago Regional Staff Div.
ATTN: C.S. Winiewicz
Regional Psychologist
230 So. Dearborn St.
Chicago, IL 60604

Miscellaneous

1 Dr. Richard Snow
Stanford University
School of Education
Stanford, CA 94305

1 Dr. Bernard M. Bass
University of Rochester
Management Research Center
Rochester, NY 14627

1 Mr. Kenneth M. Bromberg
Manager-Washington Operations
Information Concepts, Inc.
1701 North Fort Myer Drive
Arlington, VA 22209

1 Dr. Norman Cliff
University of Southern California
Department of Psychology
University Park
Los Angeles, CA 90007

1 Century Research Corporation
4113 Lee Highway
Arlington, VA 22207

1 Dr. Kenneth E. Clark
University of Rochester
College of Arts & Sciences
River Campus Station
Rochester, NY 14627

1 Dr. H. Peter Dachler
University of Maryland
Department of Psychology
College Park, MD 20742

1 Dr. Rene' V. Dawis
University of Minnesota
Department of Psychology
Minneapolis, MN 55455

1 Dr. Norman R. Dixon
Room 170
190 Lothrop Street
Pittsburgh, PA 15260

1 Dr. Robert Dubin
University of California
Graduate School of
Administration
Irvine, CA 92664

1 Dr. Marvin D. Dunnette
University of Minnesota
Department of Psychology
Minneapolis, MN 55455

1 ERIC
Processing and Reference Facility
4833 Rugby Avenue
Bethesda, MD 20014

1 Dr. Victor Fields
Montgomery College
Department of Psychology
Rockville, MD 20850

1 Dr. Edwin A. Fleishman
American Institutes for Research
Foxhall Square
3301 New Mexico Avenue, N.W.
Washington, DC 20016

1 Dr. Robert Vineberg
HumRRO Western Division
27857 Berwick Drive
Carmel, CA 93921

1 LCol CRC Lafleur, Director
Personnel Applied Research
National Defence HQ
Ottawa, Canada K1A 0K 2

1 Dr. M.D. Havron
Human Sciences Research, Inc.
7710 Old Spring House Road
West Gate Industrial Park
McLean, VA 22101

1 HumRRO
Division No. 3
P.O. Box 5787
Presidio of Monterey, CA 93940

1 HumRRO
Division No. 4, Infantry
P.O. Box 2086
Fort Benning, GA 31905

1 HumRRO
Division No. 5, Air Defense
P.O. Box 6057
Fort Bliss, TX

1 HumRRO
Division No. 6, Library
P.O. Box 428
Fort Rucker, IL 36360

1 Dr. Lawrence B. Johnson
Lawrence Johnson & Associates, Inc.
200 S. Street, N.W., Suite 502
Washington, DC 20009

1 Dr. Ernest J. McCormick
Purdue University
Department of Psychological
Sciences
Lafayette, IN 47907

1 Dr. Robert R. Mackie
Human Factors Research, Inc.
6780 Cortona Drive
Santa Barbara Research Park
Goleta, CA 93017

1 Mr. Edmond Marks
406 Old Main
Pennsylvania State University
University Park, PA 16802

1 Mr. Luigi Petrullo
2431 North Edgewood Street
Arlington, VA 22207

1 Dr. Diane M. Ramsey-Klee
R-K Research & System Design
3947 Ridgemont Drive
Malibu, CA 90265

1 Dr. Joseph W. Rigney
University of Southern
California
Behavioral Technology Laboratories
3717 South Grand
Los Angeles, CA 90007

1 Dr. Leonard L. Rosenbaum, Chairman
Montgomery College
Department of Psychology
Rockville, MD 20850

1 Dr. George E. Rowland
Rowland and Company, Inc.
P.O. Box 61
Haddonfield, NJ 08033

1 Dr. Arthur I. Siegel
Applied Psychological Services
404 East Lancaster Avenue
Wayne, PA 19087

1 Dr. C. Harold Stone
1428 Virginia Avenue
Glendale, CA 91202

1 Dr. David J. Weiss
University of Minnesota
Department of Psychology
Minneapolis, MN 55455